INCH-POUND
MIL-I-24768/1
25 February 1992
SUPERSEDING
MIL-P-15037E
2 December 1965

MILITARY SPECIFICATION SHEET

INSULATION, PLASTIC, LAMINATED, THERMOSETTING, GLASS-CLOTH, MELAMINE-RESIN (GME)

This specification is approved for use by all departments and agencies of the Department of Defense.

The requirements for acquiring the insulation material described herein shall consist of this specification sheet and the issue of the following specification listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation: MIL-I-24768.

REQUIREMENTS:

Construction: The material shall consist of glass cloth impregnated and bonded with a melamine-resin compound or binder and processed to conform to this specification.

Intended use: The laminated material covered by this specification is a flame and arc resistant, rigid plastic laminate designed for mechanical support in electrical equipment applications. The laminate shall not be applied in applications where the continuous electric stress exceeds 50 volts per mil of thickness.

Forms: Sheets and rolled tubes are recommended forms of laminated material covered by this specification.

Burning rate: The burning rate for the material covered by this specification shall be class 0.

Temperature indice: The laminated material covered by this specification has a mechanical strength test index of 140.

Dimensions and part numbers:

Thickness of sheets: The thickness of laminated sheets, permissible variations, and the applicable part number shall be as specified in table I.

AMSC N/A FSC 5970

TABLE I. *Thickness of laminated sheets.*

Part number	Nominal thickness (inches)	Permissible variations (± inch)
M24768/1-S-1	0.010	0.002
M24768/1-S-2	0.015	0.003
M24768/1-S-3	0.020	0.004
M24768/1-S-4	0.025	0.005
M24768/1-S-5	0.031	0.0065
M24768/1-S-6	0.047	0.0075
M24768/1-S-7	0.062	0.0075
M24768/1-S-8	0.094	0.009
M24768/1-S-9	0.125	0.012
M24768/1-S-10	0.156	0.015
M24768/1-S-11	0.188	0.019
M24768/1-S-12	0.219	0.021
M24768/1-S-13	0.250	0.022
M24768/1-S-14	0.312	0.026
M24768/1-S-15	0.375	0.030
M24768/1-S-16	0.438	0.033
M24768/1-S-17	0.500	0.036
M24768/1-S-18	0.625	0.040
M24768/1-S-19	0.750	0.043
M24768/1-S-20	0.875	0.046
M24768/1-S-21	1.000	0.049
M24768/1-S-22	1.125	0.053
M24768/1-S-23	1.250	0.055
M24768/1-S-24	1.375	0.058
M24768/1-S-25	1.500	0.061
M24768/1-S-26	1.625	0.064
M24768/1-S-27	1.750	0.067
M24768/1-S-28	1.875	0.070
M24768/1-S-29	2.000	0.073
M24768/1-S-30	2.125	0.079
M24768/1-S-31	2.500	0.085
M24768/1-S-32	2.750	0.091
M24768/1-S-33	3.000	0.097
M24768/1-S-34	3.500	0.110
M24768/1-S-35	4.000	0.122
M24768/1-S-36	4.500	0.134
M24768/1-S-37	5.000	0.142
M24768/1-S-38	5.500	0.156
M24768/1-S-39	6.000	0.172
M24768/1-S-40	6.500	0.180
M24768/1-S-41	7.000	0.195
M24768/1-S-42	7.500	0.210
M24768/1-S-43	8.000	0.216
M24768/1-S-44	8.500	0.232
M24768/1-S-45	9.000	0.240
M24768/1-S-46	9.500	0.255
M24768/1-S-47	10.000	0.270
M24768/1-S-48	—[1]	—[2]

See footnotes on next page.

[1]For part numbers of sheets not listed in this table, the thickness shall be included after the part number. Example of this for a 0.8125 inch thick sheet shall be: M24768/1-S-48-0.8125.
[2]On sheets of nominal thickness not listed in this table, the permissible variations shall be the same as for the next greater thickness.

Diameter of rolled round tubes: The range of sizes for rolled round tubes shall be as specified in table II. The inside diameter and outside diameter shall be included in the part number. An example of a part number for a rolled round tube with an inside diameter of 0.125 inch and an outside diameter of 0.156 inch shall be: M24768/1-TRR-0.125/0.156. The wall thickness tolerances for rolled tubes with an inside diameter up to 4 inches shall be as specified in table III.

TABLE II. *Range of sizes for rolled round tubes.*

Inside diameter (inches)		Outside diameter (inches)		Wall thickness (inch)		Maximum ratio of wall thickness to inside diameter
Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	
0.125	48.000	0.156	50.000	0.016	1.000	1/2

TABLE III. *Wall thickness tolerances.*

Wall thickness (inch)	Tolerances (± inch)
0.010 to 0.015	–
0.016 to 0.030	0.006
0.031 to 0.061	0.008
0.062 to 0.124	0.009
0.125 to 0.249	0.011
0.250 to 0.500	0.013

Performance requirements: Performance requirements for laminated materials shall be as specified in tables IV and V.

The following performance requirements do not apply to this plastic laminate:

a. Silicone content
b. Tracking resistance.

Testing: The laminated material covered by this specification shall be tested under qualification inspection requirements.

TABLE IV. *Performance requirements for sheets.*

Requirement	Cond.	Test para.	Unit	Thickness (inches)[1]									
				0.031	0.062	0.094	0.125	0.188	0.250	0.500	0.750	1.000	1.001 – Max.
Dielectric breakdown voltage[4]	A D-48/50 *D-336/50*	4.7.4	Min. kV	60.0 55.0	60.0 55.0 50.0	60.0 55.0	60.0 55.0 50.0	60.0 55.0	60.0 55.0	60.0 50.0 45.0	45.0	45.0	40.0
Dielectric strength	A D-48/50	4.7.5	Min. volts per mil		400 350								
Dielectric constant	A D-24/23 D-48/50	4.7.6	Max.	7.2	7.2 7.4	7.2 7.4	7.2 7.4 7.5	7.2 7.4	7.2 7.4	7.5 8.0	7.5 8.0	7.5 8.0	8.0
Dissipation factor[3]	A D-24/23 D-48/50	4.7.6	Max.	0.017 0.018	0.017 0.018	0.017 0.018	0.017 0.018 0.020	0.017 0.018	0.017 0.018	0.017 0.020	0.020 0.025	0.020 0.025	0.020 0.025
Volume resistivity	C–96/35/90	4.7.7	Min. megohm cm				5,000						
Surface resistance	C–96/35/90	4.7.8	Min. megohm				10,000						
Arc resistance[2]	D-48/50	4.7.9	Min. seconds		180	180	180	180	180	180	180	180	180
Tracking resistance	A	4.7.10	Min. minutes										
Impact strength[2] Lengthwise: Crosswise:	E-48/50	4.7.11	Min. ft–lbs. per inch				7.0 5.5	7.0 5.5	7.0 5.5	9.0 6.0	9.0 6.0	9.0 6.0	9.0 6.0

See footnotes at the end of table.

TABLE IV. *Performance requirements for sheets – Continued.*

Requirement	Cond.	Test para.	Unit	Thickness (inches)[1]									
				0.031	0.062	0.094	0.125	0.188	0.250	0.500	0.750	1.000	1.001 – Max.
Flexural strength			Min.										
Lengthwise:	A	4.6.12	psi	65,000	60,000	60,000	55,000	55,000	55,000	45,000	45,000	45,000	45,000
Crosswise:				45,000	40,000	40,000	35,000	35,000	35,000	30,000	30,000	30,000	30,000
Thermal endurance													
Flexural strength	E-200/150	4.6.13	Min. psi										
Lengthwise:							30,000						
Crosswise:							25,000						
Bonding strength[2]	A	4.6.15	Min.							1,700	1,700	1,700	1,700
	D-48/50		pounds							1,500	1,500	1,500	1,500
Water absorption	D_1-24/23	4.6.17	Max. percent	2.10	0.80	0.75	0.70	0.65	0.50	0.40	0.35	0.30	0.30
Silicone content	E-168/18	4.6.18	Max. ppm										
Flame resistance													
Ignition time:	A	4.6.19	Min. sec.				70		140	140			
Burning time:			Max. sec.				50		100	100			

[1]For intermediate thicknesses, the value for the next smaller thickness shall apply.
[2]Maximum thickness tested shall be 2.000 inches.
[3]For sheets with a thickness of 0.501 inch or greater, the value for the 0.750 inch thick sheet shall apply.
[4]For intermediate thicknesses, the value for the next higher thickness shall apply.

TABLE V. *Performance requirements for rolled tubes.*

Requirement	Cond.	Test para.	Unit	Wall thickness (inches) with inside diameter 0.125–8.000 inches				
				0.031–0.047	0.048–0.062	0.063–0.094	0.095–0.125	0.126–0.188
Dielectric breakdown voltage	A D-48/50 D-336/50	4.6.4	Min. kV	50.0 30.0 15.0	50.0 30.0 15.0	50.0 30.0 15.0	50.0 30.0 15.0	45.0 20.0 10.0
Dielectric strength	A D-48/50	4.6.5	Min. volts per mil	250 150	250 150	200 100	200 100	160 80
Compressive strength[1]	A	4.6.14	Min. psi			18,000	18,000	18,000
Specific gravity	A	4.6.16	Min.	1.70	1.70	1.70	1.70	1.70
Water absorption	D_1-24/23	4.6.17	Max. percent	4.2	4.2	3.0	2.5	2.0

TABLE V. *Performance requirements for rolled tubes – Continued.*

Requirement	Cond.	Test para.	Unit	Wall thickness (inches) with inside diameter 0.125–8.000 inches				
				0.189–0.250	0.251–0.375	0.376–0.500	0.501–0.750	0.751–1.000
Dielectric breakdown voltage	A D-48/50 D-336/50	4.6.4	Min. kV	45.0 20.0 10.0	45.0 20.0 10.0	45.0 20.0 10.0	45.0 20.0 10.0	45.0 20.0 10.0
Dielectric strength	A D-48/50	4.6.5	Min. volts per mil	160 80	120 60	120 60	80 40	80 40
Compressive strength[1]	A	4.6.14	Min. psi	18,000	18,000	18,000	18,000	18,000
Specific gravity	A	4.6.16	Min.	1.70	1.70	1.70	1.70	1.70
Water absorption	D_1-24/23	4.6.17	Max. percent	1.8	1.5	1.2	1.0	1.0

[1]Values apply to inside diameter of 0.750 and over and outside diameters of 2.000 inches and less.

Custodians:
Army – ER
Navy – SH
Air Force – 20

Review activities:
Army – MI, AR, EA
Navy – EC, OS
Air Force – 85

User activities:
Army – ME
Navy – MC, AS

Preparing activity:
Navy – SH
(Project 5970-1015-01)